College of Engineering, Construction & Living Sciences
Bachelor of Information Technology
IN721: Mobile Application Development
Level 7, Credits 15

Practical 01: Kotlin 1

Assessment Overview

In this assessment, you will solve 10 coding problems using **Kotlin** in **IntelliJ IDEA**. This assessment contributes 5% towards your final mark in **IN721: Mobile Application Development**.

Learning Outcomes

At the successful completion of this course, learners will be able to:

1. Implement & publish complete, non-trivial, industry-standard mobile applications following sound architectural & code-quality standards.
2. Identify relevant use cases for a mobile computing scenario & incorporate them into an effective user experience design.
3. Follow industry standard software engineering practice in the design of mobile applications.

Assessment Table

Assessment Activity	Weighting	Learning Outcomes	Assessment Grading Scheme	Completion Requirements
Practicals	10%	2, 3	CRA	Cumulative
Project	70%	1, 2, 3	CRA	Cumulative
Presentation	20%	2, 3	CRA	Cumulative

Conditions of Assessment

You will complete this assessment during your learner managed time, however, there will be availability during the teaching sessions to discuss the requirements & your progress of this assessment. This assessment will need to be completed by **Friday, 13 August 2021**.

Pass Criteria

This assessment is criterion-referenced (CRA) with a cumulative pass mark of **50%** over all assessments in **IN721: Mobile Application Development**.

Authenticity

All parts of your submitted assessment must be completely your work & any references must be cited appropriately including, externally-sourced graphic elements. Provide your references in a **README.md** file. All media must be royalty free (or legally purchased) for educational use. Failure to do this will result in a mark of **zero** for this assessment.

Policy on Submissions, Extensions, Resubmissions & Resits

The school's process concerning submissions, extensions, resubmissions & resits complies with **Otago Polytechnic** policies. Learners can view policies on the **Otago Polytechnic** website located at https://www.op.ac.nz/about-us/governance-and-management/policies.

Submissions

You must submit all program files via **GitHub Classroom**. Here is the URL to the repository you will use for your submission – https://classroom.github.com/a/Bvbfy__J. Create a new branch called **01-kotlin-1** from the **main** branch by running the command - **git checkout -b 01-kotlin-1**. This branch will be your development branch for this assessment. Once you have completed this assessment, create a pull request & assign the **GitHub** user **grayson-orr** to a reviewer. **Do not** merge your own pull request. Late submissions will incur a **10% penalty per day**, rolling over at **5:00 PM**.

Extensions

Familiarise yourself with the assessment due date. If you need an extension, contact the course lecturer before the due date. If you require more than a week's extension, a medical certificate or support letter from your manager may be needed.

Resubmissions

Learners may be requested to resubmit an assessment following a rework of part/s of the original assessment. Resubmissions are to be completed within a negotiable short time frame & usually must be completed within the timing of the course to which the assessment relates. Resubmissions will be available to learners who have made a genuine attempt at the first assessment opportunity & achieved a **D grade (40-49%)**. The maximum grade awarded for resubmission will be **C-**.

Resits

Resits & reassessments are not applicable in **IN721: Mobile Application Development**.

Instructions - Learning Outcomes 2, 3

You have been provided a directory called **practical-01-kotlin-1** containing 10 **Kotlin** files. In these files, write your solutions to the 10 problems below.

Problem 1:

Calculate the average of the given **double array** & display the expected output.

```
fun main() {
    val nums = doubleArrayOf(45.3, 67.5, -45.6, 20.34, -33.0, 45.6)

    // Write your solution here

    // Expected output:
    // Average: 16.69
}
```

Problem 2:

Write a function called **fizzBuzz** which accepts an **Int** parameter called **num**. If **num** is a multiple of three, return **Fizz**, if **num** is a multiple of five, return **Buzz** & if **num** is a multiple of three & five, return **FizzBuzz**. Call the **fizzBuzz** function in the **main** function to display the expected output.

```
// Write your fizzBuzz function here

fun main() {
    for (i in 1..15 step 2) {
      // Write your solution here
    }

    // Expected output:
    // 1
    // Fizz
    // Buzz
    // 7
    // Fizz
    // 11
    // 13
    // FizzBuzz
}
```

Problem 3:

You have been given two **mutable lists** containing the lecturer's favourite programming languages. Use the following hints to display the expected output:

- Add a specified element to the end of a list.
- Add all elements of a specified collection to the end of a list.
- If present, remove a specified element from a collection.
- Capitalise the element in the 3rd index.

```
fun main() {
    val progLangsOne: MutableList<String> = mutableListOf("C#", "JavaScript", "Kotlin", "OCaml")
    val progLangsTwo: MutableList<String> = mutableListOf("C++", "Go", "Swift", "TypeScript")

    // Write your solution here

    // Expected output:
    // [C#, JavaScript, Kotlin, OCAML, Prolog, C++, Swift]
}
```

Problem 4:

You have been given a **mutable map** containing three soft drinks & their prices. Use the following hints and **Kotlin** aggregate operations to display the expected output:

- Change the price of Coca-Cola to 4.50.
- Calculate the total price of all soft drinks.

```
fun main() {
    val softDrinks: MutableMap<String, Double>
        = mutableMapOf("Coca-Cola" to 2.00, "Fanta" to 0.90, "Sprite" to 1.10)

    // Write your solution here

    // Expected output:
    // Total price: $6.50
}
```

Problem 5:

You have been given two **mutable sets** containing two lecturer's course codes. Use the following hints to display the expected output:

- Return a set containing all elements that are contained by both collections.
- Return a set containing all distinct elements from both collections.

```
fun main() {
    val courseCodesOne: MutableSet<String> = mutableSetOf("IN607", "IN721", "IN728", "IN732")
    val courseCodesTwo: MutableSet<String> = mutableSetOf("IN512", "IN607", "IN728", "IN732")

    // Write your solution here

    // Expected output:
    // [IN607, IN728, IN732]
    // [IN607, IN721, IN728, IN732, IN512]
}
```

Problem 6:

You have been given a 5x5 grid or a **2D array** of zeros. Use the appropriate construct(s)/range(s) to access the items in the grid, i.e., zeros & replace them with Xs.

```
fun main() {
    var seating = arrayOf<Array<Any>>()
    for (i in 0..4) {
        var seat = arrayOf<Any>()
        for (j in 0..4) {
            seat += 0
        }
        seating += seat
    }

    // Write your solution here

    for (seat in seating) {
        for (value in seat) {
```

```
            print("$value ")
        }
        println()
    }

    // Expected output:
    // 0 0 0 0 X
    // 0 0 0 0 0
    // X X X 0 X
    // 0 0 0 0 0
    // 0 0 0 0 X
}
```

Problem 7:

In the expected output below, the staircase is of size three. Its base & height are both equal to **numOfSteps**. Also, it is drawn using the hash symbol. Write the logic in the **generateSteps** function in order to display the expected output.

```
fun generateSteps(numOfSteps: Int): MutableList<String> {
    val stepSeq: MutableList<String> = mutableListOf()

    // Write your solution here

    return stepSeq
}

fun main() {
    for (step in generateSteps(4)) {
        // Expected output:
        println(step) // #
                      // ##
                      // ###
                      // ####
    }
}
```

Problem 8:

You have been given a function called **defangAddress** which accepts a **String** parameter called **address**. This function returns a defanged version of **address**. A defanged address replaces every period **"."** with **"[.]"**. Write the logic in the **defangAddress** function in order to display the expected output.

```
fun defangAddress(address: String): String {
    var defangedAddr = ""

    // Write your solution here

    return defangedAddr
}

fun main() {
    // Expected output:
    println(defangAddress("255.100.50.0")) // 255[.]100[.]50[.]0
}
```

Problem 9:

You have been given an incomplete function called **isPerfectNumber** which accepts an **Int** parameter called **num**. If **num** is a perfect number, return **true**, otherwise return **false**. A perfect num is a positive integer that is equal to the sum of its positive divisors excluding the number itself.

```
// Example 1
Input: num = 6
Output: true

// Example 2
Input: num = 2
Output: false

fun isPerfectNumber(num: Int): Boolean {
    // Write your solution here
}

fun main() {
    // Expected output:
    println(isPerfectNumber(5)) // false
    println(isPerfectNumber(6)) // true
}
```

Problem 10:

You have been given an incomplete function called **removeDuplicates** which accepts an **IntArray** parameter called **nums**. Given a sorted **integer array,** remove the duplicates such that each element occurs only once & return the new length of the **array**.

```
fun removeDuplicates(nums: IntArray): Int {
    // Write your solution here
}

fun main() {
    // Expected output:
    println(removeDuplicates(intArrayOf(0, 0, 1, 1, 2, 2, 3, 3, 4))) // 5
}
```